

### CLAIMS

1. A method for measuring the concentration of impurities in helium by means of ion mobility spectrometry consisting in carrying out the analysis in one of the following conditions:
  - employing as the sample gas a helium-argon mixture formed of the helium whose content of impurities has to be determined and pure argon, said mixture containing from 0.1 to 50% of argon, and pure helium as the counterflow gas in the separation zone of the ion mobility spectrometer; or
  - employing as the sample gas the helium whose content of impurities has to be determined or a mixture thereof with pure argon, said mixture containing from 0.1 to 50% of argon, and pure argon as the counterflow gas in the separation zone of the ion mobility spectrometer; or
  - employing as the sample gas a mixture between the helium whose content of impurities has to be determined and pure argon and as the counterflow gas a helium-argon mixture containing no impurities, wherein said mixtures have an argon concentration comprised between 10 and 80%.
2. A method according to claim 1 wherein, when helium or a mixture thereof is used as sample gas and pure argon as counterflow gas, the ratio between the flow rate of the counterflow gas and that of the sample gas is equal or higher than 10.
3. A method according to claim 2, wherein said ratio is comprised between 15 and 20.
4. A method according to claim 1 wherein, when two helium-argon mixtures are used as sample gas and as counterflow gas, said mixtures have an argon concentration comprised between 30 and 40%.
5. A method according to claim 1 wherein, when two helium-argon mixtures are used as sample gas and as counterflow gas, said mixtures have the same argon concentration.
6. A method according to claim 5 wherein said mixtures are obtained by using a system (10) wherein the flow of helium containing impurities coming from a line (11) and a flow of pure argon coming from a line (12) are mixed in a line (13), by checking the mixing ratio by means of flow rate control elements (C); by

subsequently dividing the so obtained mixture into two portions conveyed into two secondary lines (13', 13''); by conveying the portion of gas in the first of said secondary lines (13') without further treatments to the reaction zone (14) of an IMS instrument (15); and conveying the portion of gas in the second of said secondary lines (13'') to a purification system (16) which removes all the impurities present in this portion of mixture, and subsequently as counterflow gas to the separation zone (17) of the IMS instrument (15).

7. A method according to claim 6 wherein said purification system (16) comprises a purifier containing getter alloys based on zirconium or titanium.
8. A method according to claim 6 wherein said purification system (16) comprises a purifier based on nickel.
9. A method according to claim 8 wherein said purification system (16) further comprises a catalytic bed of palladium oxide.